

**UNCLASSIFIED**

**AD NUMBER**

**AD824494**

**LIMITATION CHANGES**

**TO:**

**Approved for public release; distribution is unlimited.**

**FROM:**

**Distribution authorized to U.S. Gov't. agencies and their contractors;  
Administrative/Operational Use; 01 NOV 1966.  
Other requests shall be referred to Assistant Chief of Staff for Force Development (Army), Washington, DC 20310.**

**AUTHORITY**

**AGO ltr 29 Apr 1980**

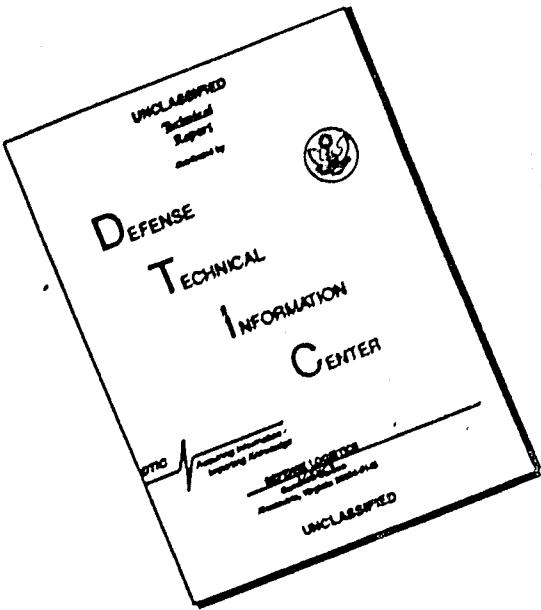
**THIS PAGE IS UNCLASSIFIED**

THIS REPORT HAS BEEN DELIMITED  
AND CLEARED FOR PUBLIC RELEASE  
UNDER DOD DIRECTIVE 5200.20 AND  
NO RESTRICTIONS ARE IMPOSED UPON  
ITS USE AND DISCLOSURE.

DISTRIBUTION STATEMENT A

APPROVED FOR PUBLIC RELEASE;  
DISTRIBUTION UNLIMITED,

# **DISCLAIMER NOTICE**



**THIS DOCUMENT IS BEST  
QUALITY AVAILABLE. THE COPY  
FURNISHED TO DTIC CONTAINED  
A SIGNIFICANT NUMBER OF  
PAGES WHICH DO NOT  
REPRODUCE LEGIBLY.**

**AD 824494**



CHIEF OF STAFF FOR  
DEPT. OF ARMY (OFFICE OF ASST. CHIEF OF STAFF FOR FORCE DEVELOPMENT (ATTN: FOR-OT-RD))  
WASH. DC 20310

STATEMENT #2 UNCLASSIFIED

This document is subject to special export controls and each transmittal to foreign governments or foreign nationals may be made only with prior approval of

DEPT. OF ARMY (OFFICE OF ASST. CHIEF OF STAFF FOR FORCE DEVELOPMENT (ATTN: FOR-OT-RD))

WASH. DC 20310

**FOR OFFICIAL USE ONLY**

**DEPARTMENT OF THE ARMY**  
**OFFICE OF THE ADJUTANT GENERAL**  
**WASHINGTON, D.C. 20310**

IN REPLY REFER TO  
AGAM-P (M) (28 Oct 66) FOR OT

1 November 1966

SUBJECT: Letter of Transmittal

TO: SEE DISTRIBUTION

1. Forwarded as inclosure is Operational Report - "Lessons Learned" from Headquarters, 46th Engineer Battalion (Construction) for Period 1 May 1966 to 31 July 1966. Information contained in this report will be reviewed and evaluated by CONARC in accordance with paragraph 6c and d of AR 1-19. Evaluations and corrective actions will be reported to ACSFOR OT within 90 days of receipt of covering letter.
2. Information contained in this report is provided to the Commandants of the Service Schools to insure appropriate benefits in the future from lessons learned during current operations, and may be adapted for use in developing training material.

BY ORDER OF THE SECRETARY OF THE ARMY:

KENNETH G. VICKHAM  
Major General, USA  
The Adjutant General

1 Incl  
a/s

DISTRIBUTION:

Commanding General  
US Continental Army Command  
Commandants  
US Army Command and General Staff College  
US Army War College  
US Army Air Defense School  
US Army Armor School  
US Army Artillery and Missile School  
US Army Chemical Corps School  
US Army Engineer School  
US Army Military Police School  
US Army Infantry School  
US Army Intelligence School  
US Army Medical Field Service School  
US Army Ordnance School  
US Army Quartermaster School  
US Army Security Agency School

D D C  
R R P  
JAN 2 1968  
REGULATED  
D

FOR OT RD  
660178  
Incl!

**FOR OFFICIAL USE ONLY**

HEADQUARTERS  
46 TH ENGINEER BATTALION (CONSTRUCTION)  
APO 96491

EBA-1

11 August 1966

SUBJECT: Operational Report on Lessons Learned for Period 1 May 1966  
to 31 July 1966 (RCS: CSGPO-28 (R-1))

TO: See Distribution

1. SIGNIFICANT ORGANIZATIONAL ACTIVITIES:

The quarter started with the battalion preparing for the AGI by representatives from the USAKV staff. Although the battalion gave priority to projects each company passed the AGI with flying colors. Because of the heavy commitments the vehicles were not removed from job sites to be inspected. The maintenance portion of the inspection consisted of the administration of the motor pool and spot checks of available vehicles. The battalion has always had one of the lowest deadline rates of any comparable unit in-country, and had no difficulty with this part of the inspection.

→ The majority of construction effort available in the Long Binh area was expended on three large projects, all of which started last quarter. The headquarters for II Field Forces is now operational but construction continues on areas for new units assigned or attached to the headquarters. The 90th Replacement Battalion's new cantonment area is now 78% complete and can handle up to 3000 men with provisions for expanding to 6000 men. The highest priority project for the period was the continuation and enlargement of the Long Binh Ammunition Supply Point. The II Field Force Headquarters is assigned to C Company with the 90th Replacement and Ammo Supply Point assigned to B Company. Support for all the projects has been received from other units of the 159th Engineer Group. The battalion also completed a barge off-loading facility on the Dong Nai River known as the Cogido Dock. This was an addition to existing facilities and improvement of the existing piers. This project more than doubled the capacity for unloading barges in the Vietnamese III Corps area. The facility was turned over in a ceremony witnessed by Brigadier General R.R. Ploger, Commanding General of the 18th Engineer Brigade, Colonel J.H. Hottenroth, Commanding Officer, 159th Engineer Group, and representatives from the 4th Transportation Command, the using agency.

Foe OT RD  
660178

In addition to the major projects for other units the battalion was able to build maintenance facilities for all the companies to include the 3rd echelon repair shops. They were completed on a self-help basis or in some cases as an assigned project. The battalion waited 10 months for the all weather maintenance facilities. These buildings will undoubtedly save time and money by reducing time lost and preventing the loss of hand tools and small parts in deep mud during the monsoon rains.

The Officers Mess, NCO Club and Battalion Headquarters building were completed during the past quarter and every staff section is now located in a semi-permanent building equipped with office furniture. This has increased efficiency and facilitated storage of plans, files and records that were deteriorating from the dust and weather.

In the Vung Tau area, D Company provided support to the Australian Forces to develop a large supply area and troop staging area. Also, they aided special forces units in securing their camps by providing the necessary equipment and operators to construct barriers and to clear obstacles for fields of fire. D Company remains the only engineer general construction company in Vung Tau and supports many allied units with construction equipment and technical advice.

The 536th Port Construction Detachment remains in Vung Tau and provides port construction capability for Vung Tau and elsewhere in the III Corps area, Vietnam. Their activity was primarily one of design for the port development of the Vung Tau area, and providing assistance to other units. The largest single mission was the assembling and rehabilitation of twenty-four Army Barges for the Fourth Transportation Command (Terminal).

Morale in the battalion remained excellent with sufficient quotas for both in-country and out-of-country R&R to meet the demands for the battalion. In many cases the people are able to select both time and location of their R&R. This has proven to be one of the best morale boosters available to the unit commanders in our battalion. A central welfare fund administered by a battalion level unit fund council was originated, providing funds for welfare items.

As the quarter ended the battalion had completed eleven months in-country and was preparing to say good-bye and well done to those who arrived with the battalion from Fort Polk. Late in June, the battalion received a four man advance party from "C" Company of the 577th Engineer Battalion. The rest of that company will be attached to the battalion in early August.

**2. COMMANDER'S RECOMMENDATIONS AND OBSERVATIONS AND LESSONS LEARNED:**

**PART I, Observations (Lessons Learned)**

a. ITEM: Effect of rains on waterpoints.

b. DISCUSSION:

1. Following a heavy rain the streams are always flooding and have an excessive amount of mud making it difficult to purify the water or requiring extremely large amounts of chemicals.

2. By placing check dams and building settling basins, the stream velocity is slowed, reducing the turbidity of the water.

OBSERVATION: By controlling flooding near the water points, water purification is more efficient and provides a continuous source of potable water.

a. ITEM: Non-standard electrical wiring.

b. DISCUSSION: American Electrical supplies are quite difficult to obtain and local purchase items are frequently used as a substitute. Electrical wire purchased from the local sources is neither standard nor uniform in quality. The quality is generally lower than American procured electrical supplies. Because of this, many problems arose in using locally purchased wire for circuits designed for standard american wire.

c. OBSERVATION: Locally procured supplies should be tested and rated before installation to determine if they are acceptable for use.

a. ITEM: Shortage of pull chain shower heads.

b. DISCUSSION: When pull chain shower heads are used water is saved. If regular shower heads and valves are used, water runs continuously when the shower is turned on, and wastes thousands of gallons of water. Because of a shortage of the pull chain type the majority of units use regular shower heads and valves using more water than necessary.

c. OBSERVATION: Pull chain shower heads should be supplied in sufficient quantity to equip troop showers in the field.

a. ITEM: Using track drills in place of wagon drills.

b. DISCUSSION: By using larger bits on a track drill, holes can be drilled from 4' to 8' as compared to the 3' spacing achieved with the wagon drill. This provides more flexibility in quarry work. The track drill also has greater maneuverability allowing drilling on rough and inclined rock ledges.

**FOR INFORMATION ONLY**

c. OBSERVATION: Track drills should be issued and used for quarries in Vietnam.

a. ITEM: Crusher operations:

b. DISCUSSION:

1. Over burden and mud mixed with blast rock was clogging the 75 ton/hr crushers and hampering rock production.

2. By putting a water tank on the headwall of a primary unit and removing the 1" screens the rock was washed prior to being fed into the crusher jaws. However, in order to be effective the chute must be modified by cutting the inclined portion of the chute, allowing it to drop to a vertical position, thus allowing dirt and waste to fall on the conveyor belt.

c. OBSERVATION: It is possible to obtain cleaner gravel for concrete and at the same time, produce rock more efficiently by using field expedient methods of separating over burden and mud from blastrock.

a. ITEM: Quality control of concrete poured on a self-help basis.

b. DISCUSSION: It was noted that units who borrowed concrete mixers did not always have the knowledge required to produce quality concrete. In order to assure a concrete batch that would be durable for general purpose this unit sent volume boxes with each concrete mixer loaned for self-help projects. In addition, instruction was provided so quality concrete could be produced by non-engineer units.

c. OBSERVATION: If at all possible, instructions should be given to units engaged in self-help projects along with volume boxes designed to provide an accurate mix for quality concrete.

a. ITEM: Storage of construction supplies.

b. DISCUSSION: The rainy season makes open storage for construction materials very impractical since lumber, plywood and cement are very susceptible to water damage. Covering by scrap canvas is only partially successful because of the limited amount of scrap canvas available for use. Cement that is issued with outer plastic bags has proven to be more economical due to inherent protection from the bags. The only successful method of storage would be to have covered storage for construction materials that are easily damaged by wet weather.

c. OBSERVATION: Large warehouses should be provided on a priority basis for units responsible to storing construction material.

## ~~FOR INFORMATION ONLY~~

a. ITEM: Water purification unit spare parts.

b. DISCUSSION: Because of the large number of units supported by our water point the units are run up to 20 hrs a day to produce the amount of water required. This causes a high rate of wear in later purification units creating a critical shortage of repair parts.

c. OBSERVATION: Basic load of spare parts should be reviewed and increased to provide backup for two years of continuous operation.

a. ITEM: Laterite Backfill Placement & Compaction.

b. DISCUSSION: During hauling operations for the expansion of the Long Binh Ammunition Supply Point, the following figures have been compiled: Original estimates considered 96,650 cubic yards, placed in two 8 to 10 inch lifts for a compacted total depth of 12 inches, to be sufficient to accomplish 36,600 feet of roadway and 59 each 100' x 100' storage pads. In actual construction, after the monsoon rains started, 136,365 cubic yards of laterite were required. This actual construction increase of nearly twice the original estimate is attributed to the heavy monsoonal rains. The laterite in the Long Binh area consists of  $\frac{1}{2}$  inch to 1 inch rock like nodules and a highly plastic, fatty clay binder. After the moisture content of the soil passes its plastic limit it fails completely. If on the other hand it is placed at optimum moisture or below optimum on a stable sub-base it can be compacted and shaped into a very weather resistant surface. Even if dry laterite is bridged out over a saturated subbase and compacted, the road will fail if used for sustained hauling operations following a heavy rain. This subbase failure will cause potholes and deep ruts that hold water following rains, and saturate the base laterite. Thus, both road and subbase have failed. If laterite is placed loose and hit by rain, saturating the loose laterite, it cannot be compacted. In both cases mentioned above the laterite must be dozed out and replaced.

c. OBSERVATION: When calculating amount of haul and length of times for sustained haul during the monsoon season, the length of time and amount of laterite should be doubled, approximately, in the Long Binh area. Large laterite hauling operations should be programmed for dry seasons unless it is determined the results obtained are worth twice the effort normally required for dry weather operations.

# FOR INFORMATION ONLY

## a. ITEM: Operation of Work Barge.

### b. DISCUSSION:

1. This unit's 6 X 18 ponton work barge is propelled by 2, 165 bhp outboard propelling units.

2. Under standard operating procedures, each unit is operated independently of the other. This required an operator for each propelling unit and a third crew member located forward to provide directions and coordinate the two operators, thus causing a great deal of difficulty in maneuvering the barge.

3. A "flyway bridge" walkway was designed and built approximately seven feet above the rear section of the work barge. Also, through the use of mechanical linkages, the control of both propelling units was transferred to one central location on the bridge. Now one operator can maneuver the barges quicker, safer and easier than was previously done with 3 men.

c. OBSERVATION: This modification could be adopted by other units using similar work barges in order to free men for other tasks and still do the job better.

## PART II: RECOMMENDATIONS

1. When equipment that is not a duplication of TO&E equipment is issued as an augmentation, it requires people to be diverted from assigned duties to train as operators for the new equipment. Since the augmentation is often essential to accomplish a mission or will greatly increase operating efficiency of the unit, equipment should be provided with trained operators if possible. It is recommended that operators for the specialized equipment located in theatre or depot stocks, be identified for priority assignment to a unit requesting the augmentation. Thus a unit could request a special authorization for equipment with operators and receive both at approximately the same time. Specialized equipment would include all equipment not normally found on a battalion size unit's TO&E.

2. This battalion has been in-country for 11 months in one location. Almost 100% of the tents leak quite badly. Replacing the tents is impractical, even if tents were in sufficient supply. While it is recognized to be impractical to build semi-permanent buildings for locations that are known to be temporary those areas that are permanent (or semi-permanent) could have T.O. Construction type buildings which would be more economical and would certainly improve living conditions and raise the morale of the troops. It is recommended that installations of a permanent (or semi-permanent) nature have semi-permanent structures built for living quarters. This would also assist in reducing the number of replacement tents required for Viet Nam.

~~FOR OFFICIAL USE ONLY~~

GEORGE MASON  
LTC, CE  
Commanding

DISTRIBUTION:

1-Asst Chief of Staff for Force Development  
Department of the Army (ACSFOR, DA)  
Washington D.C. 20310 (Channels)

2-Asst Chief of Staff for Force Development  
Department of the Army (ACSFOR, DA)  
Washington D.C. 20310 (Direct - GP)

1-Commander in Chief  
United States Army, Pacific  
ATTN: GPOP-MH  
APO 96558

3-Deputy Commanding General  
United States Army, Vietnam  
ATTN: AVC-DH  
APO 96307

25-Commanding General  
18th Engr Bde  
APO 96307

3-Commanding Officer  
159th Engr Gp (Const)  
APO 96491

1-Each Company & Section  
46th Engr Bn (Const)  
1-536th Engr Det (PC)  
1-Co "C" 577th Engr  
2-File